Docket No.: 8733.388.00
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Oh Nam KWON, et al.	Customer No.: 30827
Application No.: 09/788,420	Confirmation No. 5851
Filed: February 21, 2001	Art Unit: 2871
For: LIQUID CRYSTAL DISPLAY DEVICE AND FABRICATING METHOD THEREOF	Examiner: Timothy L. RUDE

MS **Appeal Brief – Patents**
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APPEAL BRIEF

In response to the Notice of Panel Decision mailed September 27, 2012, the Notice of Appeal and Pre-Appeal Brief Request for Review filed August 8, 2012 and the Final Office Action dated May 9, 2012 finally rejecting claims 1-7, 27, 29 and 30, Appellants hereby submit this Appeal Brief.

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This brief contains items under the following headings as required by 37 C.F.R. § 41.37(c):

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is: LG Display Co., Ltd., the assignee of record.

II. RELATED APPEALS AND INTERFERENCES

Appellants state that they have no knowledge of any prior or pending appeals, judicial proceedings, or interferences, which may be related to, directly affect or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 is directed to a liquid crystal display device, which is illustrated in Figures 2 and 3A-3E and throughout the specification, for example, at pages 6 to 8. The liquid crystal display device includes a substrate (32 in Fig. 2; Spec. at page 6, lines 7-17); a first conductive layer and a pad layer on the substrate, wherein the first conductive layer and the pad layer are patterned from the same conductive layer (34, 36 in Figs. 2 and 3A; Spec. at page 7, line 4 to page 8, line 3); a first insulating layer (38 in Fig. 2; Spec. at page 6, lines 7-17) on the substrate, the first conductive layer and the pad layer, the first insulating layer having a contact hole exposing a portion of the pad layer (49 in Figs. 2 and 3D; Spec. at page 7, line 4 to page 8, line 3); a semiconductor layer on the first insulating layer (40 in Fig. 2; Spec. at page 6, lines 7-17); second conductive layers on the semiconductor layer (42 in Fig. 2; Spec. at page 6, lines 7-17); third conductive layers on the second conductive layers (44, 46 in Fig. 2; Spec. at page 6, lines 7-17); a second insulating layer on the third conductive layers and the first insulating layer (48 in Fig. 2; Spec. at page 6, lines 7-17), the second insulating layer having a first contact hole exposing a portion of the third conductive layers (47 in Figs. 2 and 3D; Spec. at page 7, line 4 to page 8, line 3), and a second contact hole exposing the portion of the pad layer through the first and the second insulating layer (47 in Figs. 2 and 3D; Spec. at page 7, line 4 to page 8, line 3); a first plated adhesion conductive layer located only on the area of the third conductive layer exposed by the first contact hole (50 in Figs. 2 and 3D; Spec. at page 7, line 4 to page 8, line 3) and a second plated adhesion conductive layer located only on the area of the pad layer exposed by the second contact hole (50 in Figs. 2 and 3D; Spec. at page 7, line 4 to page 8, line 3), wherein the first plated adhesion conductive layer is directly contacted with the third conductive layer and the second plated adhesion conductive layer is directly contacted with the pad layer (50 in Figs. 2 and 3D; Spec. at page 7, line 4 to page 8, line 3), wherein the first and second plated adhesive conductive layers include a metal selected from the group consisting of Mo, Ni, Cr, Cu, Ag and Pb (50 in Figs. 2 and 3D; Spec. at page 7, line 4 to page 8, line 3); a fourth conductive layer on the second insulating layer and the first plated adhesion conductive layer and electrically contacting a portion of a third conductive layer (52 in Figs. 2 and 3E; Spec. at page 7, line 4 to page 8, line 3); a fifth conductive layer on the second insulating layer and the second plated adhesion conductive layer and electrically contacting

the pad layer (54 in Figs. 2 and 3E; Spec. at page 7, line 4 to page 8, line 3), wherein the first and second plated adhesion conductive layers are respectively contained within the first contact hole and in the second contact hole (54 in Figs. 2 and 3E; Spec. at page 7, line 4 to page 8, line 3), wherein the width of the first plated adhesion conductive layer is identical with the width of the first contact hole and the width of the second plated adhesion conductive layer is identical with the width of the second contact hole (54 in Figs. 2 and 3E; Spec. at page 7, line 4 to page 8, line 3).

IV. ARGUMENT

A. The rejection of claims 1-7 and 27 under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Admitted Prior Art ("APA") in view of U.S. Patent No. 6,188,458 ("Tagusa")[1] is improper and should be reversed.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *See* MPEP §2143; *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art. " *See In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). Furthermore, if an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. *See In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

1. Independent claim 1

The combined teachings of APA and Tagusa fail to teach or suggest each and every element of claim 1, and thus cannot render claim 1 obvious. Claim 1 is reproduced below as it stands after the Final Office Action.

> 1. A liquid crystal display device comprising:
> a substrate;
> a first conductive layer and a pad layer on the substrate, wherein the first conductive layer and the pad layer are patterned from the same conductive layer;
> a first insulating layer on the substrate, the first conductive layer and the pad layer, the first insulating layer having a contact hole exposing a portion of the pad layer;
> a semiconductor layer on the first insulating layer;
> second conductive layers on the semiconductor layer;
> third conductive layers on the second conductive layers;
> a second insulating layer on the third conductive layers and the first insulating layer, the second insulating layer having a first contact hole exposing a portion of the third conductive layers, and a second contact hole exposing the portion of the pad layer through the first and the second insulating layer;

[1] The Final Office Action at page 3 states that claims 1-7 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA alone. However, the Final Office Action at pages 5-8 also relies on Tagusa to reject claims 1-7 and 27.

a first plated adhesion conductive layer located only on the area of the third conductive layer exposed by the first contact hole and a second plated adhesion conductive layer located only on the area of the pad layer exposed by the second contact hole, wherein the first plated adhesion conductive layer is directly contacted with the third conductive layer and the second plated adhesion conductive layer is directly contacted with the pad layer, wherein the first and second plated adhesive conductive layers include a metal selected from the group consisting of Mo, Ni, Cr, Cu, Ag and Pb;

a fourth conductive layer on the second insulating layer and the first plated adhesion conductive layer and electrically contacting a portion of a third conductive layer;

a fifth conductive layer on the second insulating layer and the second plated adhesion conductive layer and electrically contacting the pad layer,

wherein the first and second plated adhesion conductive layers are respectively contained within the first contact hole and in the second contact hole,

wherein the width of the first plated adhesion conductive layer is identical with the width of the first contact hole and the width of the second plated adhesion conductive layer is identical with the width of the second contact hole.

Claim 1 is allowable over the cited references in that claim 1 recites a combination of elements including, for example, "a first plated adhesion conductive layer located only on the area of the third conductive layer exposed by the first contact hole and a second plated adhesion conductive layer located only on the area of the pad layer exposed by the second contact hole…wherein the first and second plated adhesion conductive layers are respectively contained within the first contact hole and in the second contact hole." For the reasons set forth below, the combined teachings of APA and Tagusa fail to teach or suggest the aforementioned features of claim 1, and thus cannot render claim 1 obvious.

As illustrated in Figure 3D, the second insulating layer 48 according to the present application is patterned to form the first contact hole 47 for exposing the drain electrode 46 and the second contact hole 49 for exposing the gate pad 36. Then, the first and second plated adhesion conductive layers 50 are formed within the first contact hole 47 and the second contact hole 49, respectively. *See* Originally filed specification at page 7, line 4 to page 8, line 3. Because these

conductive layers 50 are formed by an electric plating technique or a non-electrolytic plating technique, they are located only on the area of the third conductive layer 46 exposed by the first contact hole 47 and only on the area of the pad layer 36 exposed by the second contact hole 49, and respectively contained within the first contact hole 47 and the second contact hole 49. *Id.*

In the Final Office Action, the Examiner admits that APA "does not explicitly disclose an embodiment wherein the first and second adhesion conductive layers are respectively contained within the first contact hole and in the second contact hole." *See* Final Office Action at page 5, lines 12-14. The Examiner relies upon Figure 5 of Tagusa to cure the deficient teaching of APA.

Figure 5 of Tagusa clearly, however, shows that the metal nitride layer 41 is formed below the contact hole 26b, as opposed to being contained within the contact hole 26b. In various locations, Tagusa confirms that the metal nitride layer 41 is in fact formed below the contact hole 26b. For example, Tagusa at 3:51-53 discloses that "In one embodiment of the invention, a metal nitride layer is formed ***below*** the contact hole to connect the connecting electrode and the pixel electrode (emphasis added). " *See* also Tagusa at claims 2, 17 and 22.

This is further confirmed by the purpose of Tagusa's invention. Tagusa discloses "after the formation of the contact hole 26b, the cleaning solvent tends to permeate from the contact hole into the interface between the resin and the underlying transparent conductive film, causing the resin film to peel from the transparent conductive film" and "[i]n order to overcome this trouble … the metal nitride layer 41 …. is formed on the transparent conductive film under the contact hole." *Id* at 12:16-23. Thus, the purpose of the metal nitride layer 41 in Tagusa, which is formed under each contact hole through the interlayer insulating film38, is to "improve[] the adhesion between the interlayer insulating film and the underlying film." *Id.* at 21:14-20. In other words, those of ordinary skill in the art would understand that the metal nitride layer 41 is formed after forming the underlying film 37, but before forming the interlayer insulating film38, to improve their adhesion properties. Indeed, the etch profiles of both the contact hole 26b and the metal nitride layer 41 in Figure 5 of Tagusa clearly indicate this is the case. Because the contact hole 26b is formed by patterning the interlayer insulating film38, the metal nitride layer 41 is formed below the contact hole 26b, not within the contact hole 26b, which is required by claim 1.

Moreover, claim 1 further requires that the first plated adhesion conductive layer be located only on the area of the third conductive layer exposed by the first contact hole and the second plated adhesion conductive layer located only on the area of the pad layer exposed by the second contact hole. However, as shown in Figure 5, because the metal nitride layer 41 of Tagusa is formed below the contact hole 26b, the side, tapered portions of the metal nitride layer 41 are located outside the area that is exposed by the contact hole 26b.

Accordingly, Appellants respectfully submit that the combined teachings of the cited references fail to teach or suggest each and every feature of claim 1, and that the rejection of claim 1 under 35 U.S.C. § 103 (a) over APA in view of Tagusa is improper and should be reversed.

2. Dependent claims 2-7 and 27

Claims 2-7 and 27 depend from independent claim 1. Accordingly, Appellants respectfully submit that claims 2-7 and 27 are also allowable over the cited references for at least the same reasons set forth with respect to claim 1, and that the rejection of claims 2-7 and 27 under 35 U.S.C. § 103 (a) over APA in view of Tagusa is improper and should be reversed.

B. The rejection of claims 29 and 30 under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Admitted Prior Art ("APA") in view of U.S. Patent No. 6,188,458 ("Tagusa") and U.S. Patent No. 5,851,918 ("Song") is improper and should be reversed.

Claims 29 and 30 depend from independent claim 1. In the Final Office Action, the Examiner cites Song for allegedly teaching "the types of plating for adhesion layers" to reject claims 29 and 30. Thus, the addition of Song fails to cure the deficient teaching of APA and Tagusa for the same reasons as discussed with respect to claim 1. Accordingly, Appellants respectfully submit that claims 29 and 30 are also allowable over the cited references, and that the rejection of claims 29 and 30 under 35 U.S.C. § 103 (a) over APA in view of Tagusa and Song is improper and should be reversed.

V. CONCLUSION

For the foregoing reasons, Appellants respectfully request that this Honorable Board find as follows:

1) the rejection of claims 1-7 and 27 under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Admitted Prior Art in view of U.S. Patent No. 6,188,459 is improper and should be reversed; and

2) the rejection of claims 29 and 30 under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Admitted Prior Art in view of U.S. Patent No. 6,188,459 and U.S. Patent No. 5,851,918 is improper and should be reversed.

The Claims Appendix contains the set of claims involved in the present appeal.

The Office is hereby authorized to charge any fees, including the fees required under 37 C.F.R § 1.17(f), any additional fees required under 37 C.F.R. §§ 1.16, 1.17, and/or 1.136, for any necessary extension of time, or any other fees required to complete the filing of this Appeal Brief, to Deposit Account No. 50-0911. Please credit any overpayment to Deposit Account No. 50-0911.

Dated: October 25, 2012

Respectfully submitted,

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CLAIMS APPENDIX

Claims Involved In The Appeal of Application No. 09/788,420:

1. (Rejected) A liquid crystal display device comprising:

a substrate;

a first conductive layer and a pad layer on the substrate, wherein the first conductive layer and the pad layer are patterned from the same conductive layer;

a first insulating layer on the substrate, the first conductive layer and the pad layer, the first insulating layer having a contact hole exposing a portion of the pad layer;

a semiconductor layer on the first insulating layer;

second conductive layers on the semiconductor layer;

third conductive layers on the second conductive layers;

a second insulating layer on the third conductive layers and the first insulating layer, the second insulating layer having a first contact hole exposing a portion of the third conductive layers, and a second contact hole exposing the portion of the pad layer through the first and the second insulating layer;

a first plated adhesion conductive layer located only on the area of the third conductive layer exposed by the first contact hole and a second plated adhesion conductive layer located only on the area of the pad layer exposed by the second contact hole, wherein the first plated adhesion conductive layer is directly contacted with the third conductive layer and the second plated adhesion conductive layer is directly contacted with the pad layer, wherein the first and second plated adhesive conductive layers include a metal selected from the group consisting of Mo, Ni, Cr, Cu, Ag and Pb;

a fourth conductive layer on the second insulating layer and the first plated adhesion conductive layer and electrically contacting a portion of a third conductive layer;

a fifth conductive layer on the second insulating layer and the second plated adhesion conductive layer and electrically contacting the pad layer,

wherein the first and second plated adhesion conductive layers are respectively contained within the first contact hole and in the second contact hole,

wherein the width of the first plated adhesion conductive layer is identical with the width of the first contact hole and the width of the second plated adhesion conductive layer is identical with the width of the second contact hole.

2. (Rejected) The liquid crystal display device according to claim 1, wherein the first conductive layer and the pad layer include a metal.

3. (Rejected) The liquid crystal display device according to claim 2, wherein the metal includes Al.

4. (Rejected) The liquid crystal display device according to claim 1, wherein the second conductive layers include an impurity doped semiconductor.

5. (Rejected) The liquid crystal display device according to claim 4, wherein the third conductive layers have first and second parts spaced from each other and the semiconductor is etched between the first and second parts of the third conductive layers.

6. (Rejected) The liquid crystal display device according to claim 1, wherein the third conductive layers include a metal.

7. (Rejected) The liquid crystal display device according to claim 1, wherein the fourth conductive layer includes a transparent electrode.

8.-10. (Canceled)

11. (Withdrawn) The liquid crystal display device comprising:
a substrate having first and second regions;
a thin film transistor on the first region of the substrate;
a pad portion on the second region of the substrate, the pad portion including:
a first conductive layer on the substrate;

a first insulating layer on the first conductive layer;

a second insulating layer on the first insulating layer, the second insulating layer having a hole exposing a portion the first conductive layer;

a second conductive layer on the portion of the first conductive layer and contacting the first conductive layer; and

a third conductive layer on the second insulating layer and contacting the second conductive layer through the hole in the second insulating layer.

12. (Withdrawn) The liquid crystal display device according to claim 1, wherein the first conductive layer includes a metal.

13. (Withdrawn) The liquid crystal display device according to claim 12, wherein the metal includes Al.

14. (Withdrawn) The liquid crystal display device according to claim 12, wherein the third conductive layer includes a transparent electrode.

15. (Withdrawn) The liquid crystal display device according to claim 12, wherein the second conductive layer includes a metal.

16. (Withdrawn) The liquid crystal display device according to claim 15, wherein the metal is selected from the group consisting of Mo, Ni, Cr, Cu, Ag and Pb.

17. (Withdrawn) A liquid crystal display device comprising:

a substrate having first and second regions;

a switching device on the first region of the substrate, the switching device including:

a first conductive layer on the substrate;

a first insulating layer on the first conductive layer;

a second conductive layer on the first insulating layer;

a third conductive layer on the second conductive layer;

a second insulating layer on the third conductive layer, the second insulating layer having a first hole exposing a portion of the third conductive layer;

a fourth conductive layer on the second insulating layer and electrically contacting the third conductive layer; and

a fifth conductive layer between the third conductive layer and the fourth conductive layer; and

a pad portion on the second region of the substrate, the pad portion including:

the first conductive layer on the substrate;

the first insulating layer on the first conductive layer;

the second insulating layer on the first insulating layer, the second insulating layer having a second hole exposing a portion the first conductive layer;

the fifth conductive layer on the portion of the first conductive layer and contacting the first conductive layer; and

the fourth conductive layer on the second insulating layer and contacting the fifth conductive layer through the second hole in the second insulating layer.

18. (Withdrawn) The liquid crystal display device according to claim 17, wherein fifth conductive layer is selected from a group consisting of Mo, Ni, Cr, Cu, Ag and Pb.

19. (Withdrawn) A liquid crystal display device comprising:

a substrate;

a gate electrode on the substrate;

an insulating layer on the gate electrode;

a semiconductor layer on the insulating layer;

an ohmic contact layer on the semiconductor layer;

source and drain electrodes on the ohmic contact layer;

a protective layer on the source and drain electrodes, the protective layer having a hole exposing a portion of one of the source and drain electrodes;

a conductive electrode on the protective layer and electrically contacting the one of the source and drain electrodes; and

a contact layer between the one of the source and drain electrodes and the conductive electrode.

20. (Withdrawn) The liquid crystal display device according to claim 19, further comprising a pad portion on the substrate, the pad portion including:

a conductive pad on the substrate;

the insulating layer on the conductive pad;

the protective layer on the insulating layer, the protective layer having a second hole over the pad;

the contact layer contacting the pad through the second hole; and

the conductive electrode contacting the contact layer through the second hole.

21. (Withdrawn) The liquid crystal display device according to claim 19, wherein the contact layer is selected from a group consisting of Mo, Ni, Cr, Cu, Ag and Pb.

22. (Withdrawn) A method of fabricating a liquid crystal display device comprising:

forming a switching device on a first region of a substrate, the switching device including:

a first conductive layer on the substrate;

a first insulating layer on the first conductive layer;

a second conductive layer on the first insulating layer;

a third conductive layer on the second conductive layer;

a second insulating layer on the third conductive layer, the second insulating layer having a first hole exposing a portion of the third conductive layer;

a fourth conductive layer on the second insulating layer and electrically contacting the third conductive layer; and

a fifth conductive layer between the third conductive layer and the fourth conductive layer; and

forming a pad portion on a second region of the substrate, the pad portion including:

the first conductive layer on the substrate;

the first insulating layer on the first conductive layer;

the second insulating layer on the first insulating layer, the second insulating layer having a second hole exposing a portion the first conductive layer;

the fifth conductive layer on the portion of the first conductive layer and contacting the first conductive layer; and

the fourth conductive layer on the second insulating layer and contacting the fifth conductive layer through the second hole in the second insulating layer.

23. (Withdrawn) The method according to claim 22, wherein fifth conductive layer is selected from a group consisting of Mo, Ni, Cr, Cu, Ag and Pb.

24. (Withdrawn) A method of forming a liquid crystal display device comprising:

forming a gate electrode on a substrate;

forming an insulating layer on the gate electrode;

forming a semiconductor layer on the insulating layer;

forming an ohmic contact layer on the semiconductor layer;

forming source and drain electrodes on the ohmic contact layer;

forming a protective layer on the source and drain electrodes, the protective layer having a hole exposing a portion of one of the source and drain electrodes;

forming a conductive electrode on the protective layer and electrically contacting the one of the source and drain electrodes; and

forming a contact layer between the one of the source and drain electrodes and the conductive electrode.

25. (Withdrawn) The method according to claim 24, further comprising forming a pad portion on the substrate, the pad portion including:

a conductive pad on the substrate;

the insulating layer on the conductive pad;

the protective layer on the insulating layer, the protective layer having a second hole over the pad;

the contact layer contacting the pad through the second hole; and

the conductive electrode contacting the contact layer through the second hole.

26. (Withdrawn) The method according to claim 25, wherein the contact layer is selected from a group consisting of Mo, Ni, Cr, Cu, Ag and Pb.

27. (Rejected) The liquid crystal display device according to claim 1, wherein the first conductive layer and the pad layer are formed of a single metal and the third conductive layers are formed of a single metal.

28. (Canceled)

29. (Rejected) The liquid crystal display device according to claim 1, wherein the first and second plated adhesion conductive layers are electric plated.

30. (Rejected) The liquid crystal display device according to claim 1, wherein the first and second plated adhesion conductive layers are non-electrolytic plated.